

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-38. (Canceled)

39. (Currently Amended) An integrated blood treatment module, comprising:

a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port,

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end ~~that is secured~~ fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port ~~so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;~~ and

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber.

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway, and

wherein the second chamber has a downstream portion that extends below the passageway, and ~~asymmetrically surrounds~~

wherein the downstream portion of the second chamber extends completely around an upper region ~~the downstream portion of the first chamber~~ and only partially around a lower region of the first chamber.

40. (Previously Presented) An integrated blood treatment module according to claim 39, further comprising:

a first pressure measurement chamber that is secured to the blood treatment device and is connected to the first end of the pump hose, the first pressure measurement chamber having a first pressure measurement port for connection to a first pressure sensor, and the first pressure measurement port having a central axis that is parallel to a central axis of at least one access port of the housing.

41 (Currently Amended). An integrated blood treatment module according to claim ~~[[39]]~~40, further comprising:

a second pressure measurement chamber that is secured to the blood treatment device and is connected to the outlet port of the degassing device, the second pressure measurement chamber having a second pressure measurement port for connection to a second pressure sensor, the second pressure measurement port having a central axis that is parallel to a central axis of at least one access port of the housing.

42 (Currently Amended). An integrated blood treatment module according to claim [[39]]41, further comprising: a third pressure measurement chamber that is secured to the blood treatment device and is connected to the second end of the pump hose, the third pressure measurement chamber having a third pressure measurement port for connection to a third pressure sensor, the third pressure measurement port having a central axis that is parallel to a central axis of at least one access port of the housing.

43. (Previously Presented) An integrated blood treatment module according to claim 39, further comprising:

a support structure having a plurality of conduits defined therein, the blood treatment device being secured to the support structure.

44. (Previously Presented) An integrated blood treatment module according to claim 43, wherein the support structure comprises a first conduit having a first end connected to a first access port of the housing, and a second end comprised of an outlet nozzle for a waste liquid.

45. (Previously Presented) An integrated blood treatment module according to claim 43, wherein the support structure comprises a second conduit having a first end connected to a second access port of the housing, and a second end comprised of an inlet nozzle for a dialysis liquid.

46. (Previously Presented) An integrated blood treatment module according to claim 43, wherein the support structure comprises:

a third conduit having an inlet for connection to a blood withdrawal tube, and an outlet connected to the first end of the pump hose; and

a fourth conduit having an inlet connected to the second end of the pump hose, and an outlet connected to the blood inlet port of the first end-cap.

47. (Previously Presented) An integrated blood treatment module according to claim 46, wherein the support structure comprises a sixth conduit having a first end connected to the fourth conduit and a second end for connection to a pre-dilution infusion tube.

48. (Previously Presented) An integrated blood treatment module according to claim 46, further comprising:

a first pressure measurement chamber defined within the support structure and connected to the third conduit for measuring a pressure upstream of the pump hose.

49. (Previously Presented) An integrated blood treatment module according to claim 46, wherein the outlet of the third conduit and the inlet of the fourth conduit are arranged with respect to each other so that the pump hose forms a loop that extends in a plane substantially parallel to the longitudinal axis of the housing.

50. (Previously Presented) An integrated blood treatment module according to claim 49, wherein the outlet of the third conduit is located between the two end-caps and the loop formed by the pump hose extends laterally with respect to the housing of the blood treatment device.

51. (Previously Presented) An integrated blood treatment module according to claim 49, wherein the outlet of the third conduit is located along the longitudinal axis of the housing beyond the first end-cap, and the loop formed by the pump hose is offset along the longitudinal axis of the housing with respect to the housing of the blood treatment device.

52. (Previously Presented) An integrated blood treatment module according to of claim 46, wherein the outlet of the third conduit and the inlet of the fourth conduit are arranged with respect to each other so that the pump hose forms a loop that extends in a plane inclined with respect to a plane substantially perpendicular to the longitudinal axis of the housing.

53. (Previously Presented) An integrated blood treatment module according to claim 43, wherein the support structure comprises a fifth conduit having an inlet connected to the outlet port of the blood degassing device, and an outlet for connection to a blood return tube.

54. (Previously Presented) An integrated blood treatment module according to claim 53, wherein the support structure comprises a seventh conduit having a first end connected to the fifth conduit and a second end for connection to a post-dilution infusion tube.

55 (Currently Amended). An integrated blood treatment module according to claim 53, further comprising:

a second pressure measurement chamber defined within the support structure and connected to the fifth conduit for measuring a pressure downstream of the blood degassing device.

56. (Previously Presented) An integrated blood treatment module according to claim 55, further comprising,

a first pressure measurement chamber defined within the support structure and connected to the third conduit for measuring a pressure upstream of the pump hose,

wherein the first pressure measurement chamber has a port for connection to a first pressure sensor, the second pressure measurement chamber has a port for connection to a second pressure sensor, and

wherein the inlet nozzle, the outlet nozzle, the port of the first pressure measuring chamber and the port of the second measuring chamber have respective central axes that are substantially parallel.

57. (Previously Presented) An integrated blood treatment module according to claim 56, wherein the respective central axes of the inlet nozzle, the outlet nozzle, the port of the first pressure measuring chambers and the port of the second measuring chamber are substantially perpendicular to the longitudinal axis of the housing.

58. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the downstream portion of the second chamber has a lateral wall that surrounds a longitudinal axis of the degassing device and a bottom wall that is inclined with respect to the longitudinal axis of the degassing device.

59. (Previously Presented) An integrated blood treatment module according to claim 58, wherein the downstream portion of the first chamber has a lateral wall that is concentric to the lateral wall of the second chamber.

60. (Previously Presented) An integrated blood treatment module according to claim 59, wherein the lateral wall of the downstream portion of the first chamber and the lateral wall of the downstream portion of the second chamber are substantially cylindrical.

61. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the downstream portion of the first chamber has a cross-section that is substantially the same as a cross-section of the passageway between the first and the second chamber chambers.

62. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the first chamber comprises an upstream portion having a decreasing cross section.

63. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the second chamber comprises an upstream portion extending above the passageway that has a decreasing cross-section, with a larger cross-section that is substantially level with the passageway and a smaller cross-section that is substantially level with the hydrophobic membrane.

64. (Previously Presented) An integrated blood treatment module according to claim 63, wherein the upstream portion of the second chamber is substantially frusto-conical.

65. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the outlet port opens in the downstream portion of the second chamber at a location furthest to the passageway.

66. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the first chamber of the degassing device has a downstream portion having a cross-section selected with respect to a maximal flow rate of a liquid in the module so that a velocity of the liquid in the downstream portion of the first chamber is less than a predetermined velocity.

67. (Previously Presented) An integrated blood treatment module according to claim 66, wherein the cross-section of the downstream portion of the first chamber is selected with respect to the maximal flow rate of the liquid of about 500 ml/min in the module so that the velocity of the liquid in the downstream portion of the first chamber is less than about 3 m/min.

68. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the cross-section of the second chamber of the degassing device at a level of the passageway is selected so that a ratio of a velocity of a liquid within a downstream portion of the first chamber to a velocity of the liquid within the second chamber at the level of the passageway is more than a determined value.

69. (Previously Presented) An integrated blood treatment module according to claim 68, wherein the cross-section of the second chamber of the degassing device at the level of the passageway is selected so that the ratio of the velocity of the liquid within the downstream portion of the first chamber to the velocity of the liquid within the second chamber at the level of the passageway is at least about 2.

70. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the downstream portion of the second chamber forms an overflow for a fluid flowing from the first chamber into the second chamber.

71. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the first chamber, the second chambers and the passageway therebetween are arranged with respect to each other so that a flow pattern of a liquid flowing from the first chamber through the second chamber and to the outlet comprises a component that is tangential to the membrane.

72. (Previously Presented) An integrated blood treatment module according to claim 71, wherein a flow pattern of a liquid flowing from the first chamber through the second chamber and to the outlet comprises an umbrella-like component.

73. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the first chamber, the second chamber, and the passageway therebetween are arranged with respect to each other so that a flow of liquid flowing from the first chamber through the second chamber and to the outlet keeps gas bubbles in motion along an inner surface of the hydrophobic membrane.

74 (Currently Amended). An integrated blood treatment module according to claim 39, further comprising:

a protective member for protecting the hydrophobic membrane against external blows and for limiting a deformation of the hydrophobic membrane when a pressure of the liquid within the degassing device exceeds a limit.

75. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the hydrophobic membrane is arranged in a plane substantially perpendicular to a longitudinal axis of the degassing device.

76. (Previously Presented) An integrated blood treatment module according to claim 39, wherein the blood treatment device is a hemodialyzer, a hemofilter or a plasmafilter.

77. (Currently Amended) An integrated blood treatment module, comprising:
a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port ~~so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;~~

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway, and

wherein the second chamber has a downstream portion that extends below the passageway, ~~and asymmetrically surrounds the~~

wherein the downstream portion of the second chamber extends around an upper region of the downstream portion of the first chamber to a greater degree than around a lower region of the downstream portion of the first chamber; and

a support structure having a plurality of conduits defined therein, the blood treatment device being secured to the support structure.

78. (Currently Amended) An integrated blood treatment modules comprising:

a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~ fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;

a degassing device connected to the second end-cap having:

a first chamber having:

an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway, and

wherein the second chamber has a downstream portion that extends below the passageway and asymmetrically surrounds the downstream portion of the first chamber, and

wherein the downstream portion of the second chamber extends around an upper region of the downstream portion of the first chamber to a greater degree than around a lower region of the downstream portion of the first chamber; and

a support structure having a plurality of conduits defined therein, wherein the blood treatment device is secured to the support structure, and the support structure comprises:

a third conduit having an inlet for connection to a blood withdrawal tube, and an outlet connected to the first end of the pump hose; and

a fourth conduit having an inlet connected to the second end of the pump hose, and an outlet connected to the blood inlet port of the first end-cap.

79. (Currently Amended) An integrated blood treatment module, comprising:

a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~ fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane
and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first
chamber,

wherein the first chamber has a downstream portion that partially extends
within the second chamber and communicates therewith by a passageway, and

wherein the second chamber has a downstream portion that extends below
the passageway, and, ~~asymmetrically surrounds~~

wherein the degree to which the downstream portion of the second chamber
extends around the downstream portion of the first chamber decreases in a
downstream direction of flow through the second chamber; and

a support structure having a plurality of conduits defined therein, wherein the
blood treatment device is secured to the support structure, and the support structure
comprises:

a third conduit having an inlet for connection to a blood withdrawal tube,
and an outlet connected to the first end of the pump hose; and

a fourth conduit having an inlet connected to the second end of the pump
hose, and an outlet connected to the blood inlet port of the first end-cap,

wherein the outlet of the third conduit and the inlet of the fourth conduit are
arranged with respect to each other so that the pump hose forms a loop that
extends in a plane substantially parallel to the longitudinal axis of the housing.

80. (Currently Amended) An integrated blood treatment module, comprising:

a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~ fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway, and

wherein the second chamber has a downstream portion that extends below the passageway, and

wherein the degree to which the downstream portion of the second chamber
~~asymmetrically surrounds~~ extends around the downstream portion of the first
chamber gradually decreases in a downstream direction of flow through the
second chamber; and

a support structure having a plurality of conduits defined therein, wherein the
blood treatment device is secured to the support structure, and the support structure
comprises:

a third conduit having an inlet for connection to a blood withdrawal tube,
and an outlet connected to the first end of the pump hose; and

a fourth conduit having an inlet connected to the second end of the pump
hose, and an outlet connected to the blood inlet port of the first end-cap,

wherein the outlet of the third conduit and the inlet of the fourth conduit are
arranged with respect to each other ~~so that the pump hose forms a loop that~~
~~extends in a plane inclined with respect to a plane substantially perpendicular to~~
~~the longitudinal axis of the housing.~~

81. (Currently Amended) An integrated blood treatment module, comprising:
a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a
blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~ fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port so ~~that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;~~ and

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway,

wherein the second chamber has a downstream portion that extends below the passageway, and ~~asymmetrically surrounds the downstream portion of the first chamber,~~

wherein the degree to which the downstream portion of the second chamber extends around the downstream portion of the first chamber reduces along a downstream direction of flow through the second chamber, and

wherein the downstream portion of the second chamber has a lateral wall that surrounds a longitudinal axis of the degassing device and a bottom wall that is inclined with respect to a longitudinal axis of the degassing device.

82. (Currently Amended) An integrated blood treatment module, comprising:
a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~ fluidly connected to the housing and a second end that is fluidly connected to the blood inlet port ~~so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;~~ and

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway, ~~and~~

wherein the second chamber has a downstream portion that extends below the passageway, ~~and asymmetrically surrounds~~

wherein the degree to which the downstream portion of the second chamber extends around the downstream portion of the first chamber gradually reduces along a downstream direction of flow through the second chamber, and

an upstream portion of the second chamber extending above the passageway that has a decreasing cross-section, with a larger cross-section that is substantially level with the passageway and a smaller cross-section that is substantially level with the hydrophobic membrane.

83. (Currently Amended) An integrated blood treatment module, comprising:
a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured~~ connected to the housing to provide fluid communication between the first end and the housing, and a second end that is connected to provide fluid communication to

~~the blood inlet port so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump; and~~

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, [[and]]

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the degree to which the second chamber extends around the first chamber gradually reduces in a downstream direction of flow through the second chamber, and

wherein the first chamber has a downstream portion that partially extends within the second chamber, communicates therewith by a passageway, and has a cross-section selected with respect to a maximal flow rate of the liquid in the module so that a velocity of the liquid in the downstream portion of the first chamber is less than a predetermined velocity.

84. (Currently Amended) An integrated blood treatment module, comprising:
a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is ~~secured to~~ connected to the housing to provide fluid communication between the first end of the pump hose and the housing, and a second end that is connected to provide fluid communication between the second end of the pump hose and the blood inlet port so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump; and

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway,

wherein the degree to which the second chamber extends around the downstream portion of the first chamber decreases in a downward direction, and

wherein the cross-section of the second chamber of the degassing device at a level of the passageway is selected so that a ratio of a velocity of the liquid within a downstream portion of the first chamber to a velocity of the liquid within the second chamber at the level of the passageway is more than a determined value.

85. (Currently Amended) An integrated blood treatment modules comprising:
a blood treatment device having:

a housing having a longitudinal axis,

a first end-cap closing a first end of the housing, the first end-cap having a blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is secured-connected to the housing to provide fluid communication between the first end of the pump hose and the housing, and a second end that is connected to provide fluid communication between the second end of the pump hose and the blood inlet port ~~so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;~~ and

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane
and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first
chamber,

wherein the first chamber has a downstream portion that partially extends
within the second chamber and communicates therewith by a passageway,

wherein the degree to which the first chamber is encircled by the second
chamber reduces in a downstream direction of flow through the second chamber,
and

wherein the first chamber, the second chamber, and the passageway
therebetween are arranged with respect to each other so that a flow pattern of the
liquid flowing from the first chamber through the second chamber and to the outlet
comprises a component that is tangential to the hydrophobic membrane.

86 (Currently Amended). An integrated blood treatment module, comprising:
a blood treatment device having:

a housing having a longitudinal axis;

a first end-cap closing a first end of the housing, the first end-cap having a
blood inlet port, and

a second end-cap closing a second end of the housing;

a pump hose for a peristaltic pump, wherein the pump hose has a first end that is

secured-connected to the housing to provide fluid communication between the first end of

the pump hose and the housing, and a second end that is connected to provide fluid communication between the pump hose and the blood inlet port so that the pump hose extends in a position that is complementary to a position of a race of the peristaltic pump;
and

a degassing device connected to the second end-cap having:

a first chamber having an inlet for receiving a liquid flowing into the second end-cap, and

a second chamber having an opening closed by a hydrophobic membrane and an outlet for discharging the liquid,

wherein the outlet of the second chamber is above the inlet of the first chamber,

wherein the first chamber has a downstream portion that partially extends within the second chamber and communicates therewith by a passageway,

wherein the degree to which the second chamber extends around the downstream portion of the first chamber gradually reduces in a downstream direction of the flow through the second chamber, and

wherein the first chamber, the second chambers and the passageway therebetween are arranged with respect to each other so that a flow of the liquid flowing from the first chamber through the second chamber and to the outlet keeps gas bubbles in motion along an inner surface of the hydrophobic membrane.

87. (New) The integrated blood treatment module in claim 39 wherein the downstream portion of the second chamber asymmetrically surrounds at least partially the downstream portion of the first chamber.